

AIB-ROCK28

BOX System with ROCK 3288

Quick Reference Guide

1st Ed – 13 November 2020

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Part No. E2017AR28A0R

FCC Statement



THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

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1. Getting Started

1.1 Safety Precautions

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

- 1 x AIB-ROCK28 system
- 1 x Screw kit
- 1 x Adapter
- 1 x Power cord
- 1 x Wifi dipole antenna
- 1 x LTE dipole antenna & SMA cable (option)



If any of the above items is damaged or missing, contact your retailer.

1.3 System Specifications

Component	
Mother Board	ACP-RK3288
CPU	RockChip RK3288W
CPU Cooler	Heatsink
Memory	2GB DDR3L
Storage	16GB eMMC
Power Supply	DC in
Adapter	60W, 12V power adaptor
Operating System	Android 8.1
Wifi / BT	1 x 802.11 b/g/n Wireless LAN
External I/O	
DC in Power jack	1 x Power Jack
USB Port	4x USB Type A
Video Port	1x HDMI
Audio Port	1x Headphone Jack for Line out
Expansion Slots	1x Micro SD slot
Reset	1 x Reset
Lan	1 x RJ45
COM port	3 x RS232 (Tx / Rx, Tx / Rx / RTS / CTS, Tx / Rx / RTS / CTS) 1 x RS485 (Tx1- / TX1+)
GPIO	2 in / 2 out
Button	1 x Power button
Antenna connector	1 x LTE Antenna SMA connector (knockout) 1 x Wifi Antenna SMA connector
Mechanical	
Power Type	12V~24V wide voltage DC input
Power Connector Type	DC jack
Dimension	164 x 120 x 40 (mm)
Weight	0.74 kg
Color	Black
Fanless	Yes
OS Support	Android 8.1
Reliability	
EMI Test	CE FCC class B

AIB-ROCK28

Safety	2014/35/EU LVD EN62368-1 Low Voltage Directive
Random Vibration Operation	<ol style="list-style-type: none"> 1. PSD: 0.00454G²/Hz , 1.5 Grms 2. Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 minutes per each axis 6. IEC 60068-2-64 Test:Fh 7. Storage : CF or SSD
Sine Vibration Test (Nonoperation)	<ol style="list-style-type: none"> 1. Test Acceleration: 2G 2. System condition: Non-Operating mode 3. Test Frequency : 5-500Hz 4. Sweep: 1 Oct/ per one minute. (logarithmic) 5. Test Axis: X,Y and Z axis 6. Test time: 10 min. each axis <p>Reference IEC 60068-2-6 Testing procedures</p>
Package vibration test	<ol style="list-style-type: none"> 1. PSD: 0.026G²/Hz, 2.16 Grms 2. Non-operation mode 3. Test Frequency: 5-500Hz 4. Test Axis: X,Y and Z axis 5. 30 min. per each axis 6. IEC 60068-2-64 Test:Fh
Vibration Test	<p>Random Vibration Operation</p> <ol style="list-style-type: none"> 1 Test PSD : 0.00454G²/Hz , 1.5 Grms 2 System condition : operation mode 3 Test frequency : 5~500 Hz 4 Test axis : X,Y and Z axis 5 Test time : 30 minutes per each axis 6 IEC60068-2-64 Test Fh 6 Storage : mSATA <p>Sine Vibration test (Non-operation)</p> <ol style="list-style-type: none"> 1 Test Acceleration : 2G 2 Test frequency : 5~500 Hz 3 Sweep : 1 Oct/ per one minute. (logarithmic) 4 Test Axis : X,Y and Z axis 5 Test time :30 min. each axis 6 System condition : Non-Operating mode 7. Reference IEC 60068-2-6 Testing procedures <p>Package Vibration Test:</p>

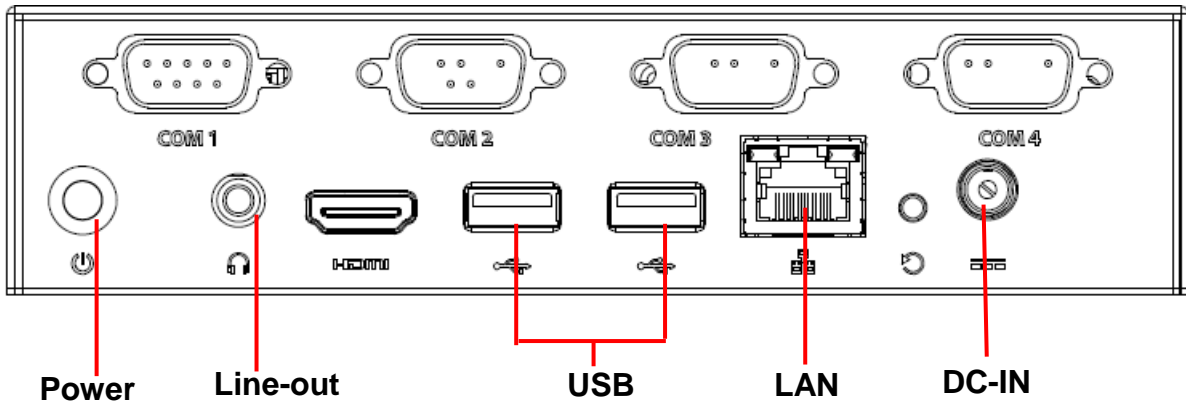
	<p>1 Test PSD : 0.026G²/Hz , 2.16 Grms</p> <p>2 Test frequency : 5~500 Hz</p> <p>3 Test axis : X,Y and Z axis</p> <p>4 Test time : 30 minutes per each axis</p> <p>5 IEC 60068-2-64 Test Fh</p>
Mechanical Shock Test	10Grms, IEC 60068-2-27, Half Sine, 11ms
Package Drop test	<p>1 One corner , three edges, six faces</p> <p>2 ISTA 2A, IEC-60068-2-32 Test:Ed</p>
Operating Temperature	0°C ~ 40°C
Operating Humidity	40°C @ 95% relative humidity, non-condensing
Storage Temperature	-20°C ~ 60°C



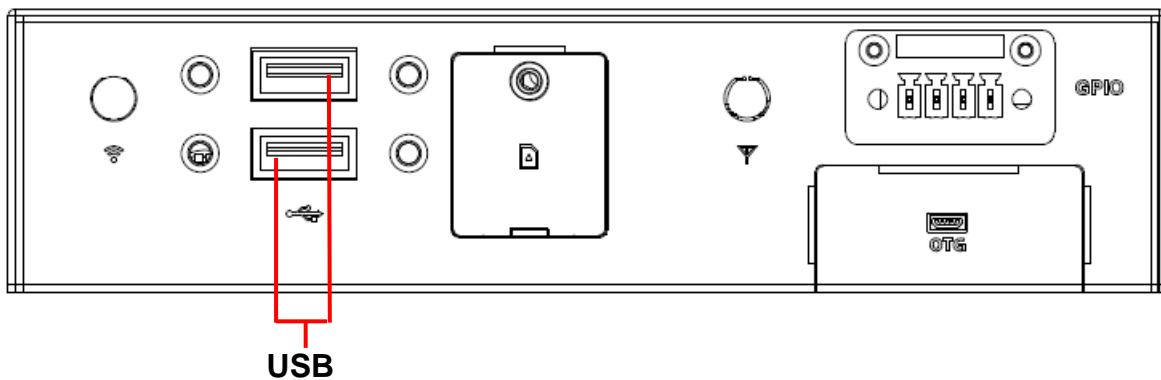
Note: Specifications are subject to change without notice.

1.4 System Overview

1.4.1 Front View



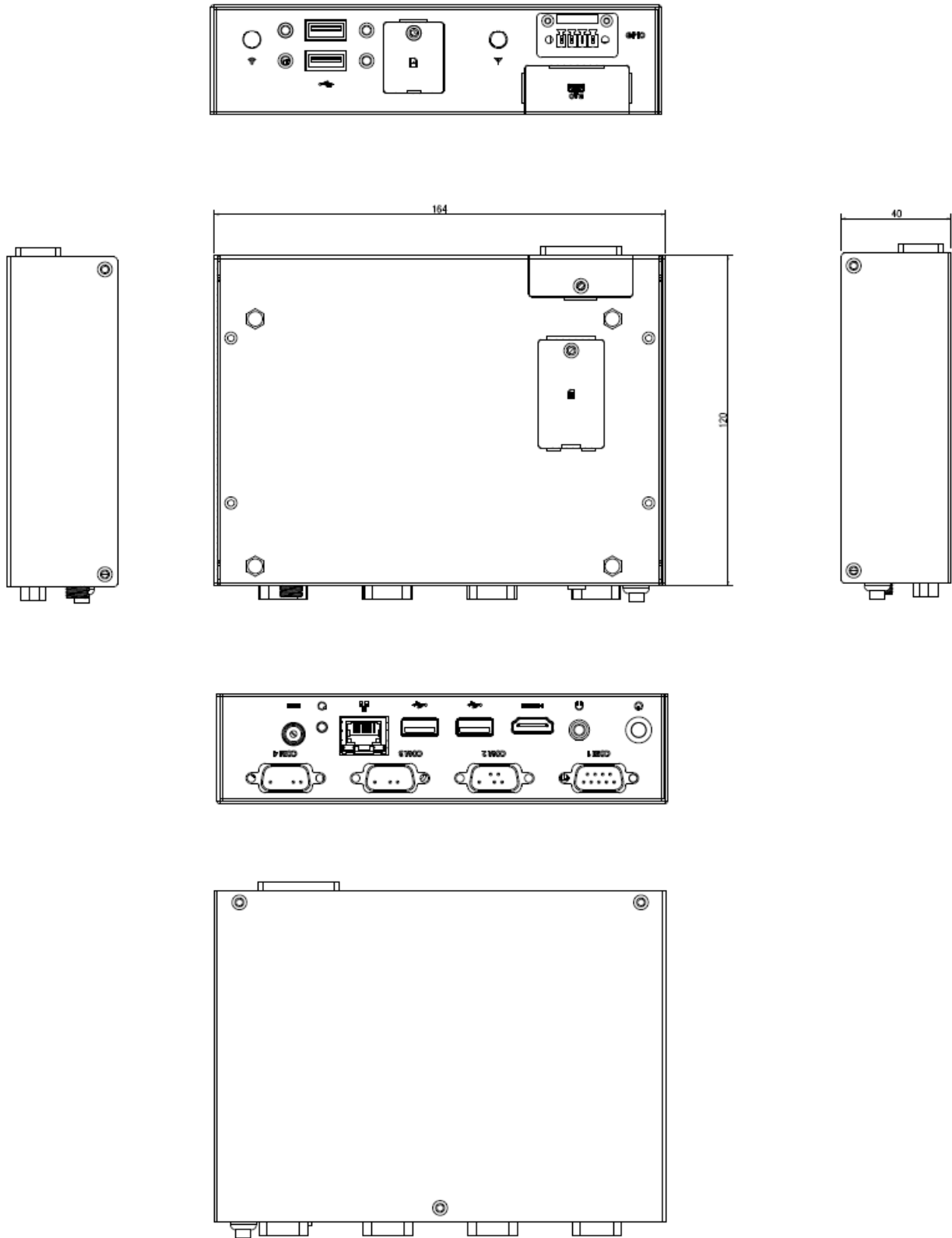
1.4.2 Rear View



Connectors

Label	Function	Note
Power	System Power indicator	
Line-out	Line-out audio jack	
HDMI	HDMI connector	
COM1/2/3/4	Serial port 1/2/3/4 connector	
USB	4 x USB Type A	
HDMI	HDMI connector	
LAN	RJ-45 Ethernet	
DC-IN	DC power-in connector	
GPIO	General purpose I/O connector	
OTG	OTG connector	

1.5 System Dimensions



(Unit: mm)

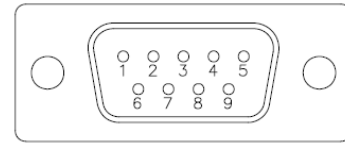
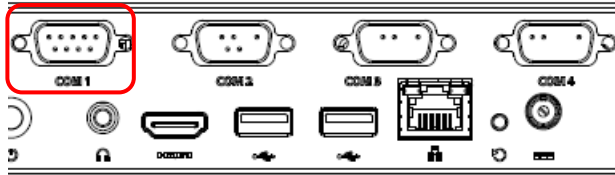
2. Hardware Configuration

For advanced information, please refer to:

- 1- ACP-RK3288 User's Manual

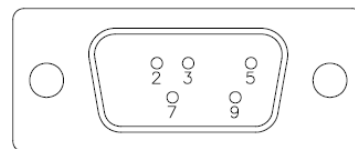
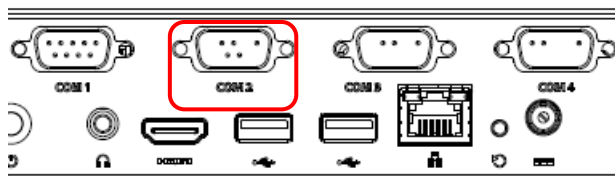
2.1 AIB-ROCK28 connector mapping

2.1.1 Serial port 1 connector (COM1)



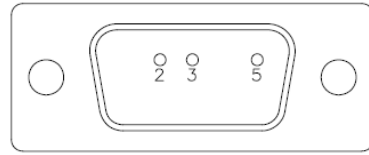
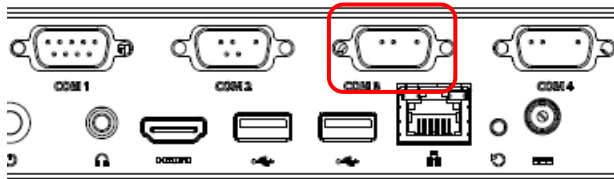
Signal	PIN	PIN	Signal
	1	6	
RX	2	7	RTS
TX	3	8	CTS
	4	9	
GND	5		

2.1.2 Serial port 2 connector (COM2)



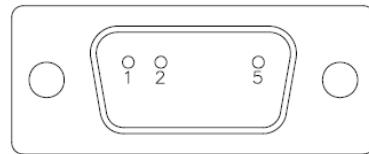
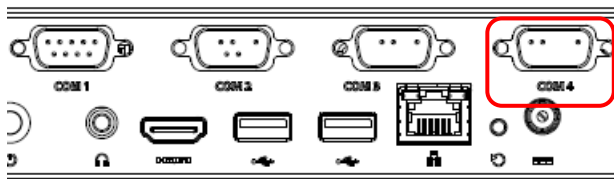
Signal	PIN	PIN	Signal
	1	6	
RX	2	7	RTS
TX	3	8	CTS
	4	9	
GND	5		

2.1.3 Serial port 3 connector (COM3)



Signal	PIN	PIN	Signal
	1	6	
RX	2	7	
TX	3	8	
	4	9	
GND	5		

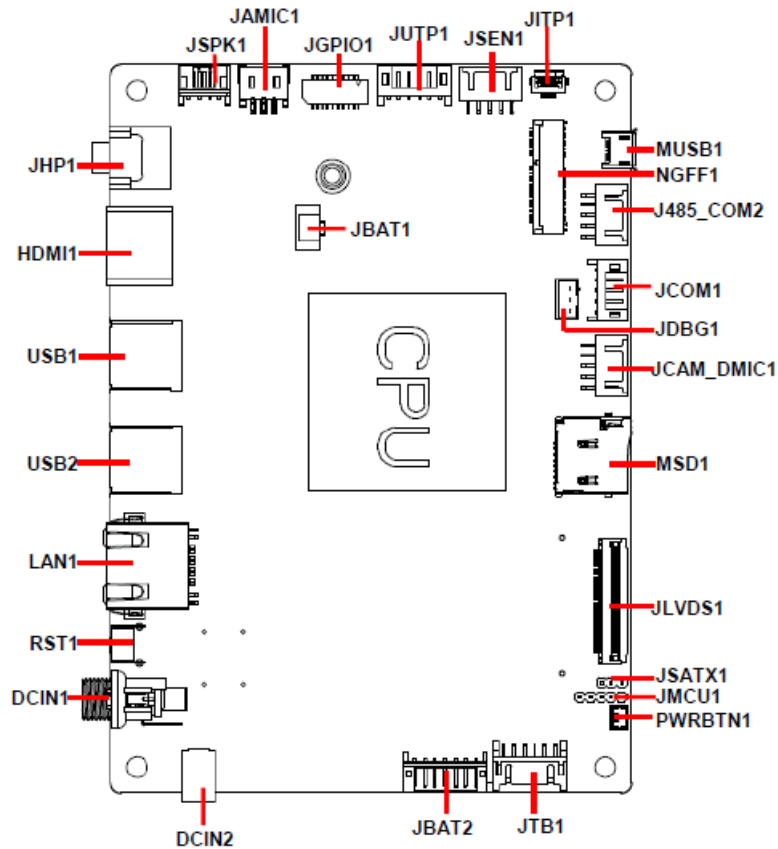
2.1.4 Serial port 4 connector (COM4)



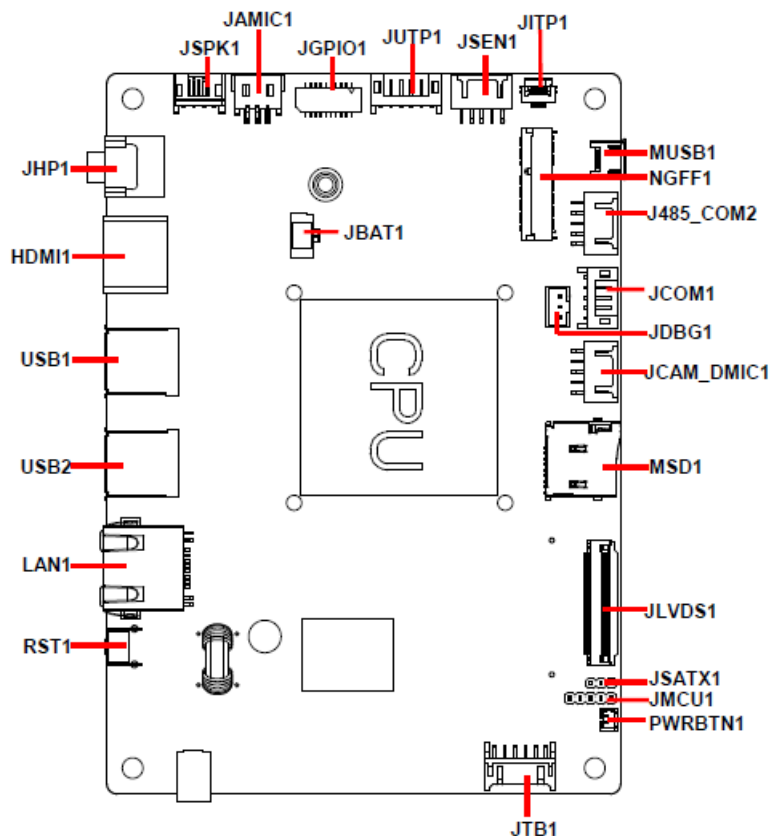
Signal	PIN	PIN	Signal
TX1-	1	6	
TX1+	2	7	
	3	8	
	4	9	
GND	5		

2.2 ACP-RK3288 Overviews

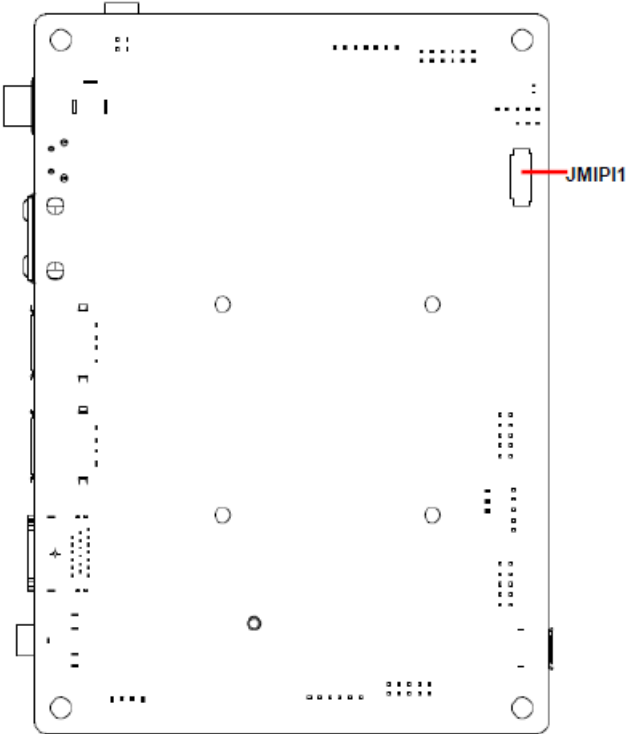
ACP-RK3288(DCIN)



ACP-RK3288(Powered LAN)



AIB-ROCK28



2.3 ACP-RK3288 Connector list

Jumpers

Label	Function	Note
JSATX1	AT/ATX Input power select	3 x 1 header, pitch 2.00 mm

Connectors

Label	Function	Note
JHP1	Audio line-out connector	
HDMI1	HDMI connector	
USB1/2	2 x USB 2.0 connector	
LAN1	RJ-45 Ethernet connector	
DCIN1	DC Power-in connector	
DCIN2	DC Power-in connector	2 x 2 wafer, pitch 2.00 mm
JITP1	I2C Touch Panel connector	6 x 1 FPC, pitch 0.50 mm
JSPK1	Speaker connector	4 x 1 wafer, pitch 2.00 mm
JUTP1	USB Touch connector	6 x 1 wafer, pitch 2.00 mm
RST1	Reset Button	
NGFF1	M.2 B-Key	
JMCU1	MCU Firmware upgrade connector	5 x 1 header, pitch 2.00 mm
PWRBTN1	Power Button	2 x 1 wafer, pitch 1.25 mm
MSD1	Micro SD card slot	
JBAT1	RTC Battery connector	2 x 1 wafer, pitch 1.25 mm
JBAT2	Battery connector	7 x 1 wafer, pitch 2.00 mm
JSEN1	I2C connector	5 x 2 wafer, pitch 2.00 mm
MUSB1	Micro USB2.0 connector	
JGPIO1	General purpose I/O connector	10 x 2 wafer, pitch 1.00 mm
JCAM_DMIC1	USB Camera connector	5 x 2 wafer, pitch 2.00 mm
JCOM1	Serial port 1 connector	5 x 1 wafer, pitch 2.00 mm
J485_COM2	RS-232_485 connector	5 x 2 wafer, pitch 2.00 mm
JTB1	Touch button board connector	6 x 2 wafer, pitch 2.00 mm
JAMIC1	A-MIC connector	3 x 1 wafer, pitch 2.00 mm
JDBG1	Debug connector	3 x 1 wafer, pitch 2.00 mm
JLVDS1	LVDS connector	40 x 1 FPC, pitch 0.50 mm
JMIPI1	MIPI Port	31 x 1 FPC, pitch 0.30 mm

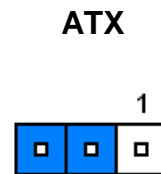
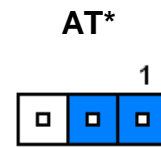
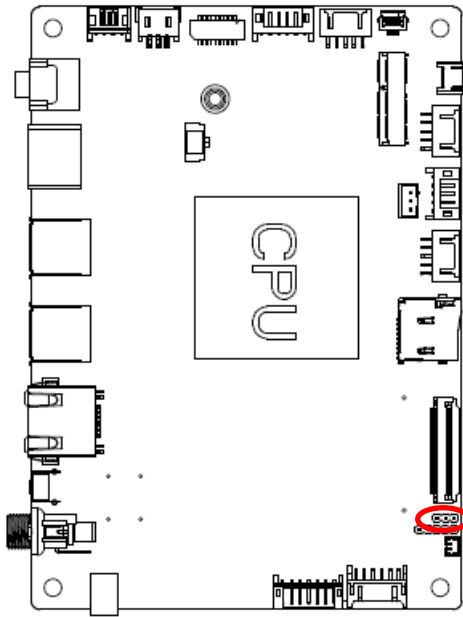
2.4 Ethernet LED behavior

LAN LED indicator definition

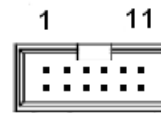
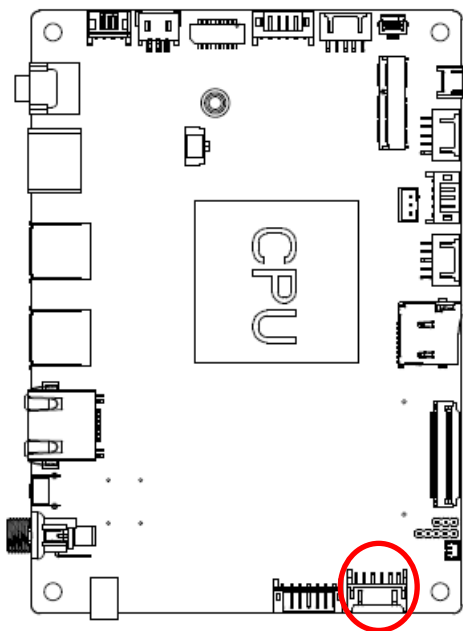
Number	Label	LED color	Indication	Meaning
1	Data Rate	Green/Orange	Off	10 Mbits/sec data rate is selected
			Green on	100 Mbits/sec data rate is selected
			Orange on	1000 Mbits/sec data rate is selected
2	Link/ACT	Yellow	Off	LAN link is not established
			Yellow on	LAN link is established
			Yellow Blinking	LAN active is occurring

2.5 ACP-RK3288 Jumpers & Connectors settings

2.5.1 AT/ATX Input power select (JSATX1)

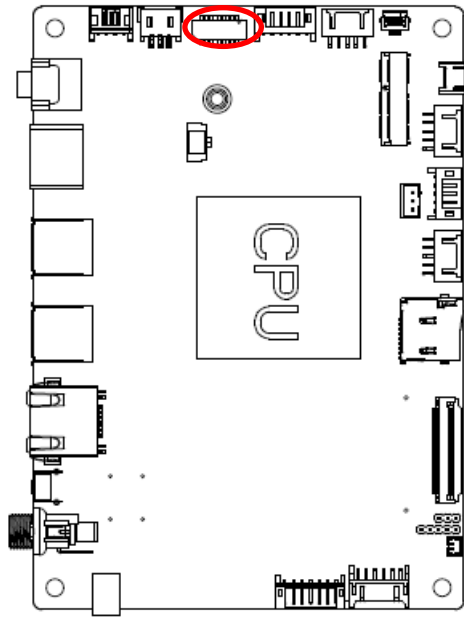


2.5.2 Touch button board connector (JTB1)



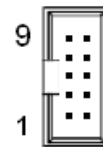
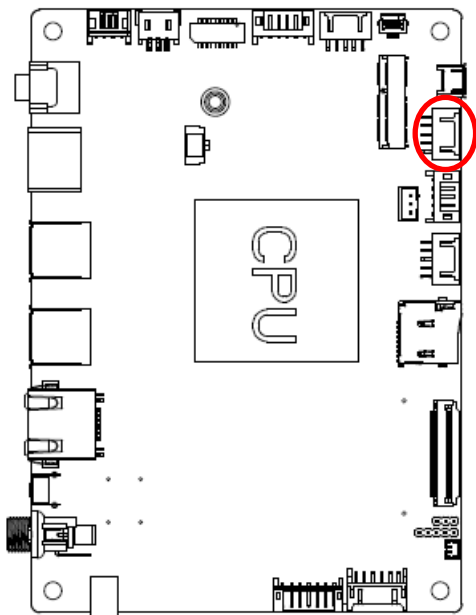
Signal	PIN	PIN	Signal
PWR_TB	1	2	GND
LINUX-SW	3	4	BU1
VOL_UP	5	6	VOL_DN
ONOFF	7	8	BR_UP
BR_DN	9	10	BU7
LED_GRN	11	12	LED_ORG

2.5.3 General purpose I/O connector (JGPIO1)



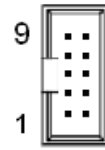
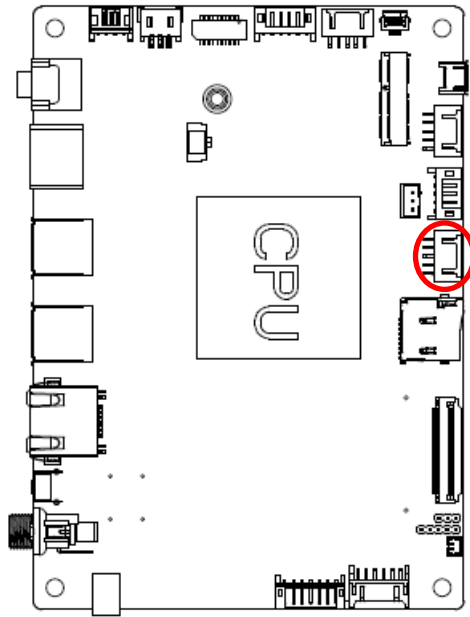
Signal	PIN	PIN	Signal
DIO_GP20	1	2	DIO_GP10
DIO_GP21	3	4	DIO_GP11
DIO_GP22	5	6	DIO_GP12
DIO_GP23	7	8	DIO_GP13
DIO_GP24	9	10	DIO_GP14
DIO_GP25	11	12	DIO_GP15
DIO_GP26	13	14	DIO_GP16
DIO_GP27	15	16	DIO_GP17
DIO_SDA_5V	17	18	DIO_SCL_5V
+V5S_DIOP	19	20	GND

2.5.4 RS-232_485 connector (J485_COM2)



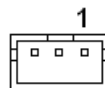
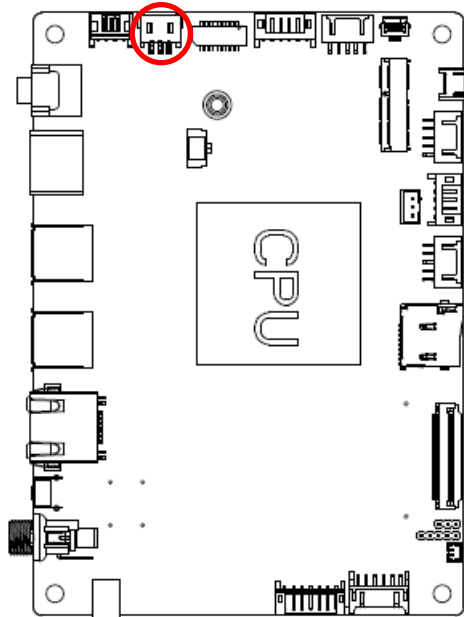
Signal	PIN	PIN	Signal
COM2_TX	1	2	+5V
COM2_RX	3	4	NC
COM2_RTS	5	6	485TX1-
COM2_CTS	7	8	485TX1+
GND	9	10	GND

2.5.5 USB Camera connector (JCAM_DMIC1)



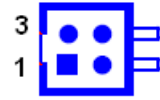
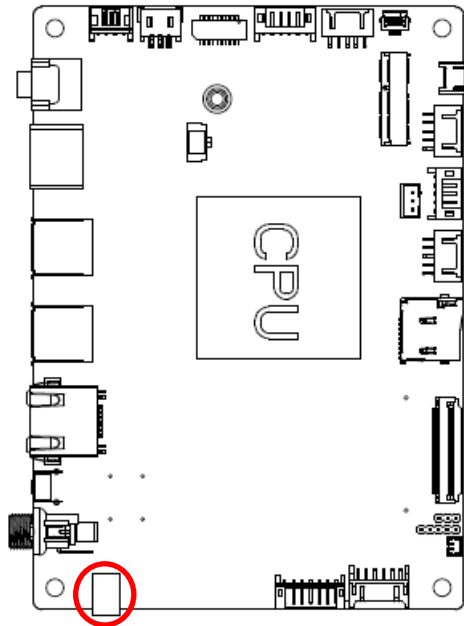
Signal	PIN	PIN	Signal
+VDD_DMIC	1	2	+5V
DMIC_CLK	3	4	USB3_NP
DMIC_DATA	5	6	USB3_PP
GND	7	8	GND
GND	9	10	GND

2.5.6 A-MIC connector (JAMIC1)



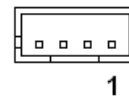
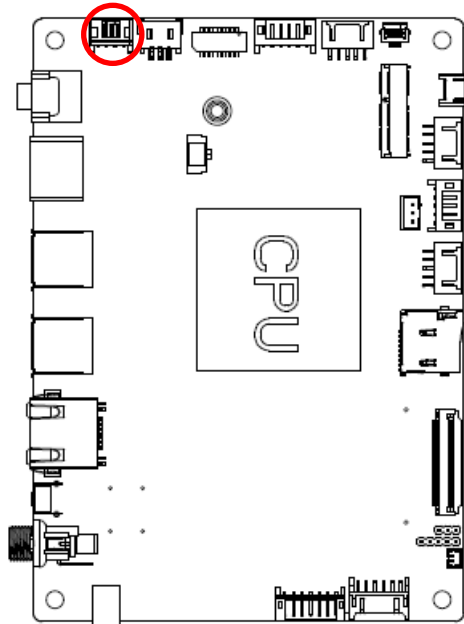
Signal	PIN
MIC_JDET#	1
MIC_INR	2
GND	3

2.5.7 DC Power-in connector (DCIN2)



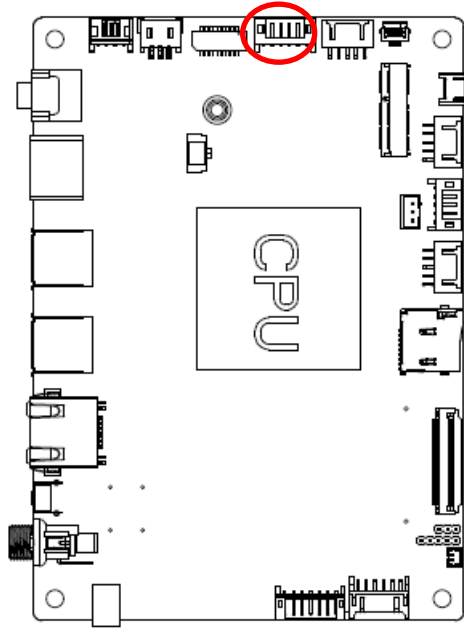
Signal	PIN	PIN	Signal
+VIN	3	4	GND
+VIN	1	2	GND

2.5.8 Speaker connector (JSPK1)



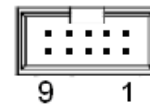
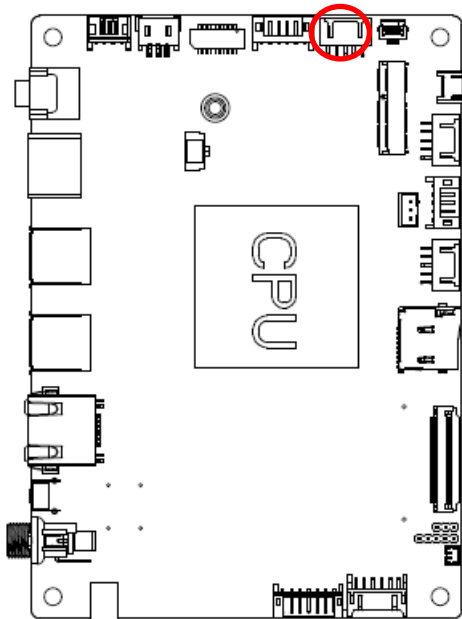
Signal	PIN
SPK_L+	1
SPK_L-	2
SPK_R+	3
SPK_R-	4

2.5.9 USB Touch connector (JUTP1)



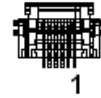
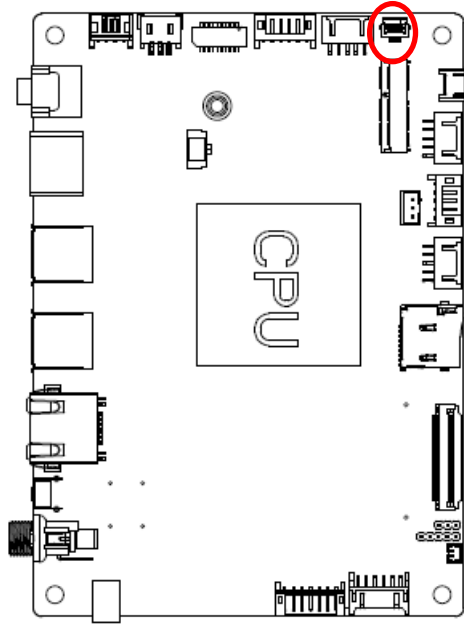
Signal	PIN
+5V	1
USBTP_PP	2
USBTP_NP	3
NC	4
USB_RST_P	5
GND	6

2.5.10 I2C connector (JSEN1)



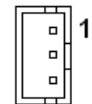
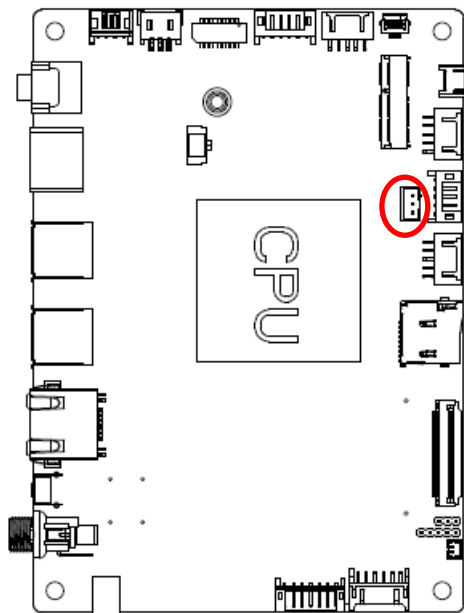
Signal	PIN	PIN	Signal
+3.3V	1	2	+3.3V
SEN1_SCL	3	4	SEN2_SCL
SEN1_SDA	5	6	SEN2_SDA
SEN1_IRQP#	7	8	SEN2_IRQP#
GND	9	10	GND

2.5.11 I2C Touch Panel connector (JITP1)



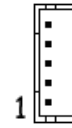
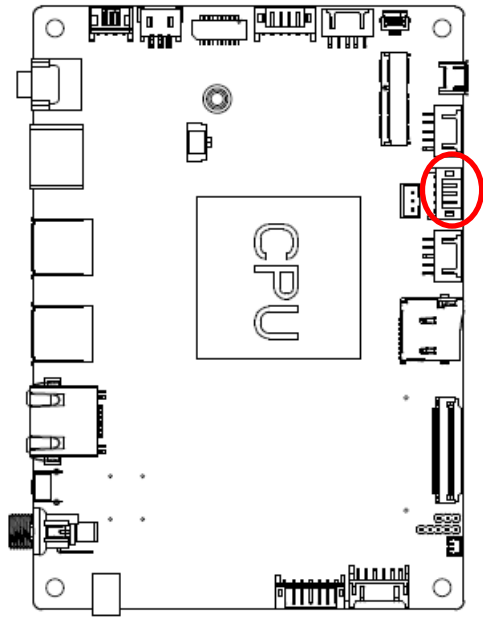
Signal	PIN
TOUCH_RST#_R	6
TOUCH_SDA	5
TOUCH_SCL	4
TOUCH_IRQP#	3
GND	2
+3.3V	1

2.5.12 Debug connector (JDBG1)



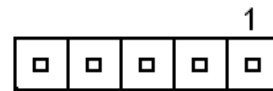
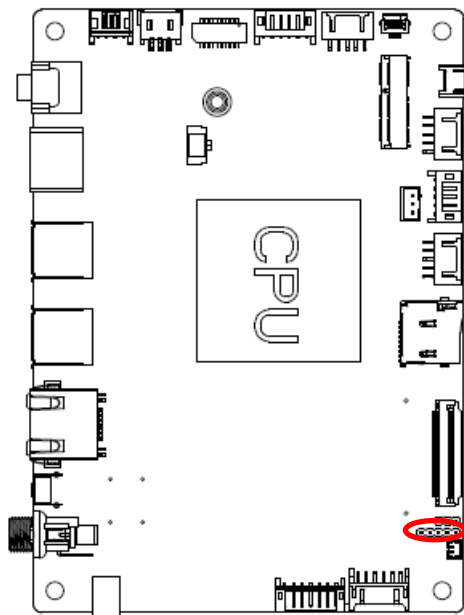
Signal	PIN
CNSL_TX	1
CNSL_RX	2
GND	3

2.5.13 Serial port 1 connector (JCOM1)



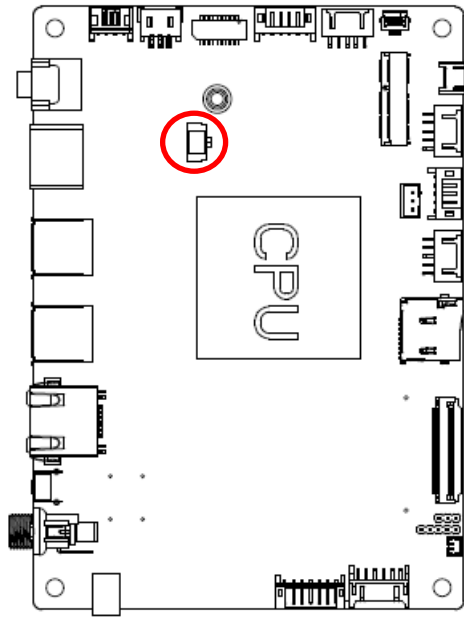
Signal	PIN
GND	5
COM1_CTS	4
COM1_RTS	3
COM1_RX	2
COM1_TX	1

2.5.14 MCU Firmware upgrade connector (JMCU1)



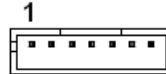
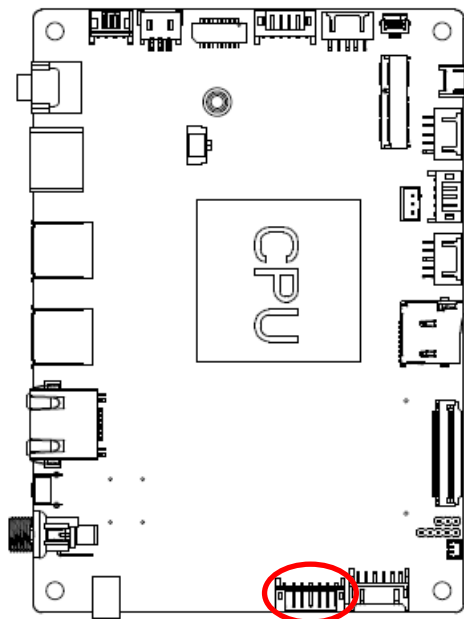
Signal	PIN
+V5MCU	1
MCU_MCLR	2
MCU_ICSPCLK	3
MCU_ICSPDAT	4
GND	5

2.5.15 RTC Battery connector (JBAT1)



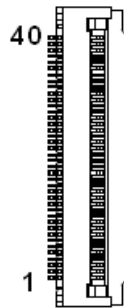
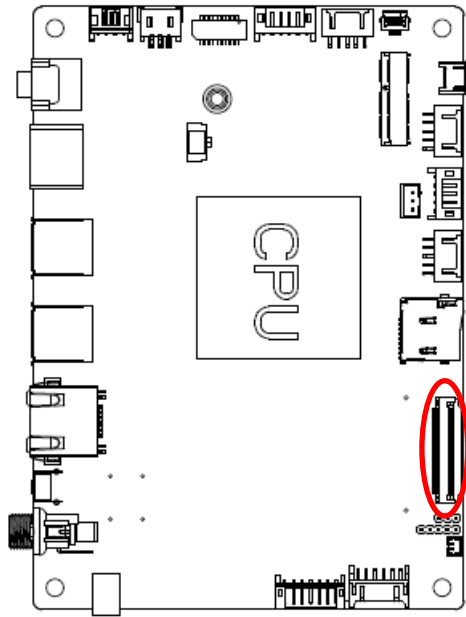
Signal	PIN
+V_BAT	1
GND	2

2.5.16 Battery connector (JBAT2)



Signal	PIN
+V_BATP	1
+V_BATP	2
BAT_SCL	3
BAT_SDA	4
BAT_TS	5
GND	6
GND	7

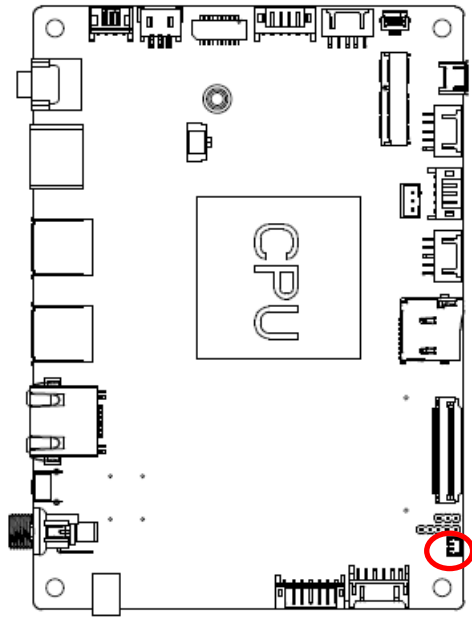
2.5.17 LVDS connector (JLVDS1)



Signal	PIN
NC	40
+3.3V	39
+3.3V	38
NC	37
NC	36
NC	35
NC	34
LVDS0_TX0_N	33
LVDS0_TX0_P	32
GND	31

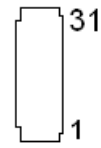
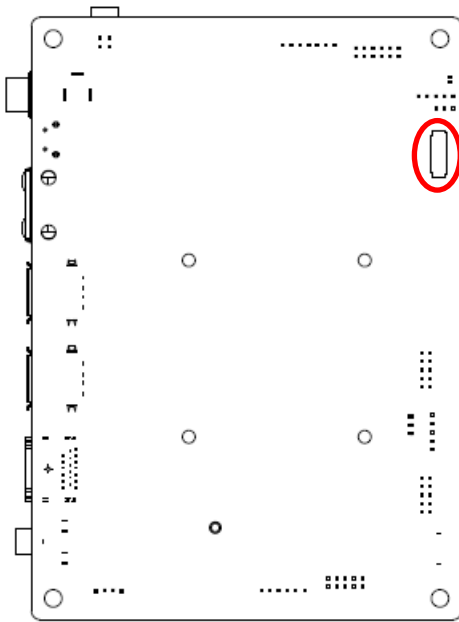
Signal	PIN
LVDS0_TX1_N	30
LVDS0_TX1_P	29
GND	28
LVDS0_TX2_N	27
LVDS0_TX2_P	26
GND	25
LVDS0_CLK_N	24
LVDS0_CLK_P	23
GND	22
LVDS0_TX3_N	21
LVDS0_TX3_P	20
GND	19
NC	18
NC	17
GND	16
NC	15
NC	14
GND	13
NC	12
NC	11
GND	10
GND	9
GND	8
NC	7
BKLT_CTL	6
BKLT_EN	5
NC	4
+V7S_BKLT	3
+V7S_BKLT	2
+V7S_BKLT	1

2.5.18 Power Button (PWRBTN1)



Signal	PIN
PMIC_PWRON#	1
GND	2

2.5.19 MIPI Port (JMIP11)



Signal	PIN
+VLED+	31
+VLED+	30
NC	29
+VLED-	28
+VLED-	27
+VLED-	26
NC	25
GND	24
MIPI_TX3_N	23
MIPI_TX0_N	22
MIPI_TX3_P	21

Signal	PIN
MIPI_TX0_P	20
GND	19
GND	18
MIPI_CLK_N	17
MIPI_TX1_N	16
MIPI_CLK_P	15
MIPI_TX1_P	14
GND	13
GND	12
MIPI_TX2_N	11
NC	10
MIPI_TX2_P	9
NC	8
NC	7
MIPI_RST#	6
+1.8V	5
+1.8V	4
+3.3V	3
+3.3V	2
+3.3V	1

